

CLAIMS

1. An information display apparatus (22, 262) comprising:

a reflecting plate (44) having a main surface (44A); and

5 a plurality of polarizing plates (80, 82, 86, 90, 92, 96, 100, 102) arranged on at least a part of a plurality of areas (50-72, 280-302) defined with a predetermined interval and width on said main surface (44A), each having an axis of polarization equal to any of a plurality of different directions; wherein

10 a code is optically transmitted by light beams reflected from areas (50, 52, 56, 60, 62, 66, 70, 72) of said main surface (44A) on which said plurality of polarizing plates (80, 82, 86, 90, 92, 96, 100, 102) are arranged and areas (54, 64) of said main surface on which said polarization plates (80, 82, 86, 90, 92, 96, 100, 102) are not arranged.

2. The information display apparatus (22, 262) according to claim 1, wherein

15 said reflecting plate (44) is a retroreflecting plate.

3. The information display apparatus (22, 102) according to claim 1, further comprising

20 a transparent cover member (42) having a color of similar hue to said polarizing plates (80, 82, 86, 90, 92, 96, 100, 102), provided to cover said main surface (44A) and said plurality of polarizing plates (80, 82, 86, 90, 92, 96, 100, 102).

4. The information display apparatus (22, 102) according to claim 1, further comprising

25 a light shielding plate (88, 98) arranged on at least a part of said plurality of areas (50-72, 280-302).

5. The information display apparatus (22, 102) according to claim 4, wherein a

surface of said light shielding plate (88, 98) has a color of similar hue to said polarizing plates (80, 82, 86, 90, 92, 96, 100, 102).

5 6. The information display apparatus (22, 102) according to claim 1, further comprising

 a plurality of partition members (46) provided on said main surface (44A) of said reflecting plate (44) at a predetermined interval to define said plurality of areas (50-72, 280-302).

10 7. The information display apparatus according to claim 6, wherein each of said plurality of polarizing plates (80, 82, 86, 90, 92, 96, 100, 102) is detachably mounted on said plurality of areas (50-72, 280-302) partitioned by said plurality of partition members (46).

15 8. An information display apparatus (22, 262) comprising:
 a reflecting plate (44) having a main surface (44A);
 a plurality of polarizing plates (80, 82, 86, 90, 92, 96, 100, 102) arranged on at least a part of a plurality of areas (50-72, 280-302) defined with a predetermined interval and width on said main surface (44A), each having an axis of polarization equal to any
20 of a plurality of different directions; and

 a light shielding plate (88, 98) having a color of similar hue to said polarizing plates (80, 82, 86, 90, 92, 96, 100, 102), provided in any of said plurality of areas (50-72, 280-302) where said polarizing plates (80, 82, 86, 90, 92, 96, 100, 102) are not provided; wherein

25 a code is optically transmitted by light beams reflected from areas (50, 52, 56, 60, 62, 66, 70, 72) of said main surface (44A) on which said plurality of polarizing plates (80, 82, 86, 90, 92, 96, 100, 102) are provided.

9. The information display apparatus (22) according to claim 8, wherein said reflecting plate (44) is a retroreflecting plate.

10. The information display apparatus (22, 262) according to claim 8, further comprising

a plurality of partition members (46) provided on said main surface (44A) of said reflecting plate (44) at a predetermined interval to define said plurality of areas (50-72, 280-302).

11. The information display apparatus (22, 262) according to claim 10, wherein

each of said plurality of polarizing plates (80, 82, 86, 90, 92, 96, 100, 102) and said light shielding plate (88, 98) is detachably mounted on said plurality of areas (50-72, 280-302) partitioned by said plurality of partition members (46).

12. The information display apparatus (22, 262) according to claim 1, further comprising

a transparent cover member (42) having a color of similar hue to said polarizing plates (80, 82, 86, 90, 92, 96, 100, 102), provided to cover said plurality of polarizing plates (80, 82, 86, 90, 92, 96, 100, 102) and said light shielding plate (88, 90).

13. An optical information reading apparatus (24, 264), comprising:

a plurality of photo sensors (132-142) for generating a light receiving signal of which amplitude varies in accordance with an amount of incident light of a specific wavelength range;

a plurality of polarizing plates (112-122) having mutually different predetermined directions of polarization axis, arranged to cover a light receiving surface of said plurality of photo sensors (132-142);

means (200-206) for receiving a light receiving signal from a predetermined first photo sensor (134) among said plurality of photo sensors (132-142) and for detecting existence of a series of valid signal sequence in the light receiving signal from said first photo sensor (134), said first photo sensor (134) being provided with a first polarizing plate (114) having polarization axis of a predetermined direction among said plurality of polarizing plates (112-122);

first determining means (208-212, 310, 312) responsive to said series of valid signal sequence for determining a method of decoding a signal sequence included in outputs from said plurality of photo sensors (132-134); and

means (214, 216, 314) for decoding the signal sequence included in the outputs from said plurality of photo sensors (132-134) by said determined method of decoding.

14. The optical information reading apparatus (24) according to claim 13, wherein

said first determining means (208-212) includes second determining means (212, 242-250) for determining a method of decoding a signal sequence included in outputs from said plurality of photo sensors (132-134) based on an amplitude of a signal at a predetermined position among said series of valid signal sequence.

15. The optical information reading apparatus (24) according to claim 14, wherein

said plurality of photo sensors (132-142) includes a plurality of photo sensor pairs (132-134, 136-138, 140-142);

polarizing plates (112-114, 116-118, 120-122) provided corresponding to two photo sensors included in each of said plurality of photo sensor pairs (132-134, 136-138, 140-142) have directions of polarization axes selected to cross each other at a predetermined angle;

said second determining means (212, 242-250) includes means (244, 248) for

selecting any one of said plurality of photo sensor pairs based on an amplitude of a signal at a predetermined position among said series of valid signal sequence; and

said decoding means (214, 216) includes means (214) for decoding one signal sequence from two outputs of both photo sensors included in the photo sensor pair
5 (132-134, 136-138, 140-142) selected by said selecting means (244, 248).

16. The optical information reading apparatus (24) according to claim 15,
wherein

said predetermined angle is a right angle.

10 17. The optical information reading apparatus (24) according to claim 15,
wherein

said decoding means (214) includes means (214) for determining a code based
on a combination of amplitudes of two outputs of both photo sensors included in the
15 photo sensor pair (132-134, 136-138, 140-142) selected by said selecting means (244,
248).

18. The optical information reading apparatus (24) according to claim 15,
wherein

20 said selecting means (244, 248) includes means (244, 248) for selecting any one
of said plurality of photo sensor pairs based on amplitudes of signals at a plurality of
positions including predetermined first and second positions, of said series of valid signal
sequence.

25 19. The optical information reading apparatus (24) according to claim 18,
wherein

said first position is the head of said series of valid signal sequence.

20. The optical information reading apparatus (24) according to claim 18,
wherein

said second position is the tail of said series of valid signal sequence.

5 21. The optical information reading apparatus (264) according to claim 13,
further comprising

means (270) for storing a plurality of code tables (272A-C) respectively storing
combinations of output amplitude combinations from said plurality of photo sensors
(132-142) and corresponding codes; wherein

10 said first determining means (208-312) includes means (310, 312) for
determining one of said plurality of code tables (272A-C) based on an amplitude of a
signal at a predetermined position of said series of valid signal sequence; and

said decoding means (214-218, 314) includes means (216) for converting a
combination of amplitudes of signals output from said plurality of photo sensors (132-
15 142) simultaneously with said series of valid signal sequence to a code, using the code
table (270A-C) selected by said selecting means (310, 312).

22. The optical information reading apparatus (24) according to claim 20,
wherein

20 said predetermined angle is a right angle.

23. The optical information reading apparatus (264) according to claim 20,
wherein

25 said selecting means (310, 312) includes means (330-338) for selecting any one
of said plurality of photo sensor pairs (132-134, 136-138, 140-142) based on amplitudes
of signals at a plurality of positions including predetermined first and second positions,
of said series of valid signal sequence.

24. The optical information reading apparatus (264) according to claim 23,
wherein
said first position is the head of said series of valid signal sequence.

5 25. The optical information reading apparatus (264) according to claim 23,
wherein
said second position is the tail of said series of valid signal sequence.

10 26. The optical information reading apparatus (24) according to claim 13,
wherein
said first determining means (208-212) includes second determining means (212)
responsive to said series of valid signal sequence, for determining relative positional
relation between plane of polarization of light incident on said first polarizing plate (114)
and direction of polarization axis of said first polarizing plate (114) and for determining
15 a method of decoding a signal sequence included in outputs from said plurality of photo
sensors.

27. The optical information reading apparatus (350) according to claim 26,
further comprising:
20 means (364) for changing direction of the polarization axis of said first polarizing
plate (360); and
means (366) for detecting direction of polarization axis of said first polarizing
plate (360); wherein
said second determining means includes determining means responsive to said series of
25 valid signal sequence and to an output of said detecting means (366), for determining
relative positional relation between plane of polarization of light incident on said first
polarizing plate (360) and direction of polarization axis of said first polarizing plate
(360) and for determining a method of decoding a signal sequence included in outputs
from said plurality of photo sensors (132-134, 362).

30